

[0061] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative, and not restrictive. In particular, although the embodiments above are described above with respect to PCIe sockets, other connector shapes and protocols may also be implemented in the same manner. The scope of the invention is, therefore, indicated by the appended claims, rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. An apparatus comprising:
 - a chassis defining a motherboard slot; and
 - a midplane including
 - a motherboard socket positioned to connect to a motherboard inserted within the motherboard slot; and
 - a plurality of expansion sockets electrically connected to the motherboard socket, each expansion socket of the plurality of sockets defining a plurality of connector pins arranged in one or more rows, each row of the one or more rows being coplanar and collinear with a corresponding row in the other sockets of the plurality of sockets.
2. The apparatus of claim 1, wherein:
 - each expansion socket of the plurality of expansion sockets defines an opening having a long dimension and a narrow dimension perpendicular to the long dimension, the long dimension being larger than the narrow dimension;
 - the one or more rows of connector pins of each expansion socket of the plurality of expansion sockets include first and second rows of connector pins, the first row of connector pins being positioned on a first side of an opening defined by the each socket and the second row of connector pins being positioned on a second side of the opening opposite the first side, the first and second sides being parallel to the long dimension; and
 - the first rows of connector pins of the plurality of expansion sockets are collinear and coplanar with one another and the second rows of connector pins of the plurality of expansion sockets are collinear and coplanar with one another.
3. The apparatus of claim 1, wherein the motherboard socket faces an opposite direction from the plurality of expansion sockets.
4. The apparatus of claim 1, wherein:
 - the motherboard slot is configured such that a circuit board of the motherboard inserted within the motherboard slot is parallel to a first plane; and
 - wherein each row of the one or more rows of the each expansion socket is coplanar with a corresponding row in the other expansion sockets of the plurality of expansion sockets in a plane parallel to the first plane.
5. The apparatus of claim 4, wherein the chassis defines a bottom plate parallel to the first plane.
6. The apparatus of claim 5, wherein the chassis defines upper and lower edges secured to the bottom plate and extending perpendicularly away from the bottom plate, the upper and lower edges being parallel to one another.
7. The apparatus of claim 6, wherein the motherboard receiver comprises first and second flanges secured to the bottom plate and extending perpendicularly away from the

bottom plate, first line being orthogonal to the first and second flanges, the first and second flanges being parallel to one another and each defining an edge receiver configured to receive an edge of the circuit board of the motherboard inserted within the motherboard receiver.

8. The apparatus of claim 1, wherein the plurality of expansion sockets includes four expansion sockets.

9. The apparatus of claim 8, wherein the motherboard socket includes first and second sockets offset that are collinear and coplanar.

10. The apparatus of claim 1, wherein the plurality of expansion sockets are peripheral component interconnect express (PCIe) sockets.

11. A method comprising:

providing

a chassis defining a motherboard slot; and

a midplane including (a) a motherboard socket positioned to connect to a motherboard inserted within the motherboard slot, and (b) a plurality of expansion sockets electrically connected to the motherboard socket, each expansion socket of the plurality of expansion sockets defining a plurality of connector pins arranged in one or more rows, each row of the one or more rows being coplanar and collinear with a corresponding row in all other expansion sockets of the plurality of expansion sockets;

inserting a motherboard into the motherboard slot having a connector of the motherboard inserted within the motherboard socket;

inserting a connector of a first expansion card into a first expansion socket of the plurality of expansion sockets.

12. The method of claim 11, further comprising:

removing the first expansion card from the first expansion socket; and

inserting first and second connectors of a second expansion card into the first expansion socket and a second expansion socket of the plurality of expansion sockets, the first and second connectors being monolithic portions of a single circuit board.

13. The method of claim 11, further comprising:

removing the first expansion card from the first expansion socket; and

inserting first, second, third, and fourth connectors of a second expansion card into the first expansion socket and a second, a third, and a fourth expansion socket of the plurality of expansion sockets, the first, second, third, and fourth connectors being monolithic portions of a single circuit board.

14. The method of claim 11, wherein the plurality of expansion sockets are peripheral component interconnect express (PCIe) sockets.

15. An apparatus comprising:

a plurality of expansion sockets;

a motherboard coupled to the plurality of expansion slots, the motherboard including one or more processors, one or more memory devices operably coupled to the one or more processors, and an expansion interface defining a plurality of communication lanes from the plurality of expansion sockets to the one or more processors and the one or more expansion sockets, the expansion interface programmed to

detect a number of expansion sockets occupied by an expansion card inserted into one or more of the plurality of expansion sockets; and